

Section 1: Organisms and Their Environment

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Key Ideas

- › What makes up an ecosystem?
- › How does an ecosystem maintain stability?
- › How long does it take for changes in an ecosystem to be reversed?

Bellringer

1. Living organisms die if they cannot adapt to their environments. For example, what happens to a goldfish that jumps out of or is removed from water? What would happen to a penguin if you brought it from Antarctica and set it free in Arizona in August?
2. How were people in colonial America dependent upon the environment?
3. Are we as dependent on our environment as the American colonists were?
Explain your answer.

What Is an Ecosystem?

- › What makes up an ecosystem?
- › An ecosystem is made up of all organisms living in an area and their physical environment.
- **ecosystem:** a community of organisms and their abiotic environment

What Is an Ecosystem? *continued*

- What is an ecosystem?
 - All the living and nonliving members of an ecosystem are interconnected.
 - Living elements in an ecosystem can include plants, animals, and people.
 - Nonliving elements in an ecosystem can include sunlight, air, water, soil and temperature.

Visual Concept: Ecosystem



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What Is an Ecosystem? *continued*

- Ecosystems exist all around us.
- Not all ecosystems are the same size.
 - The entire planet is one big ecosystem.
 - A puddle of water is a small ecosystem.

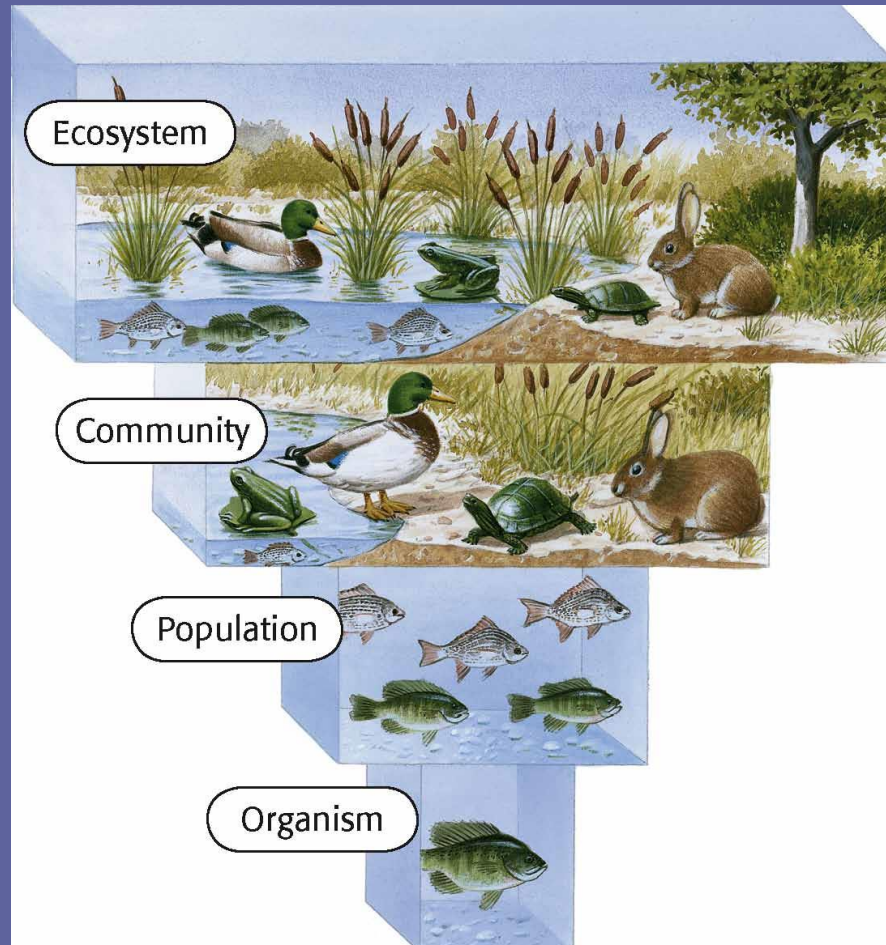
What Is an Ecosystem? *continued*

- Living things are adapted to their ecosystem.
 - Each organism has adapted to factors in its environment, such as:
 - temperature
 - humidity
 - other living things
 - Some living things cannot survive in a different ecosystem.

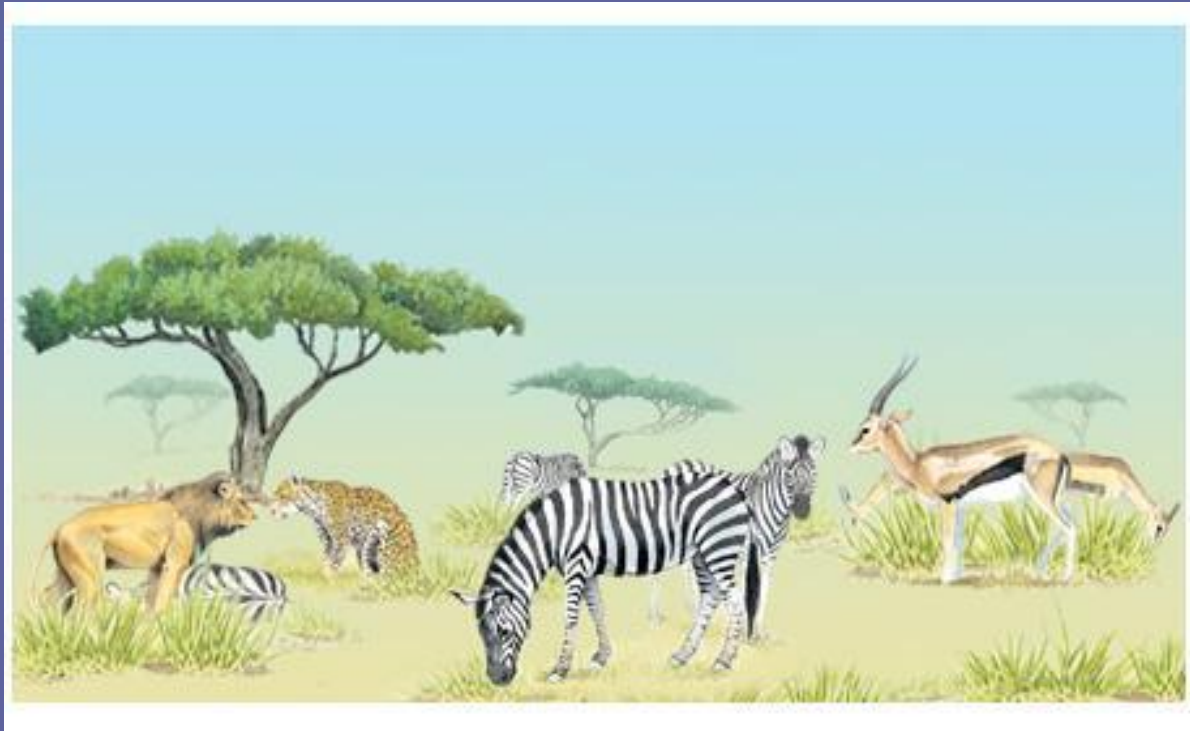
What Is an Ecosystem? *continued*

- Ecosystems are divided into communities.
 - There can be several communities within an ecosystem.
 - An organism can belong to more than one community.
- **community**: a group of various species that live in the same habitat and interact with each other

Ecosystem Structure



Visual Concept: Community



Stability in Ecosystems

- › How does an ecosystem maintain stability?
- › Ecosystems are said to be stable when each element is in balance with the others so that the ecosystem can be maintained over a long period of time.

Stability in Ecosystems, *continued*

- Balanced ecosystems remain stable.
 - When an ecosystem is balanced, the population sizes of the different species do not change much relative to one another.
 - Overall there is a natural balance between the populations of species that make their own food and the populations of species that use others for food.

Stability in Ecosystems, *continued*

- A change in one feature can affect the whole ecosystem.
 - The key to understanding ecosystems can be summed up in one word: *interrelatedness*.
 - The elements that make up an ecosystem function together to keep the entire system stable.
 - If something changes, time and natural forces often work to return the ecosystem to its previous state.

Stability in Ecosystems, *continued*

- Ecosystems tend to gradually return to their original conditions.
 - After a major change in an ecosystem, such as a fire, an ecosystem will develop until it eventually returns to its original condition.
- New ecosystems develop through the process of succession.
- **succession**: the replacement of one type of community by another at a single location over a period of time

Visual Concept: **Ecological Succession**



Evaluating Changes in Ecosystems

- › How long does it take for changes in an ecosystem to be reversed?
- › Short-term changes are usually easily reversed, but long-term changes can take many years to be reversed and may never be reversed at all.
 - An ecosystem can undergo short-term and long-term changes.

Evaluating Changes in Ecosystems, *continued*

- Short-term ecosystem changes include the seasons.
 - Short-term changes, such as seasons, can make an ecosystem look quite different at different times of the year.

Evaluating Changes in Ecosystems, *continued*

- Long-term ecosystem changes result from large scale changes on the planet.
 - Long-term changes in climate, such as ice ages and global warming, are caused by many factors.
 - Change may be caused by one large factor, such as plate tectonics, changes in Earth's tilt or orbit, changes in ocean currents, and volcanic eruptions.
 - Climate change may also be caused by combinations of many small factors that act together.

Evaluating Changes in Ecosystems, *continued*

- Changes can be caused by human activity.
 - People alter their environment in a variety of ways, such as:
 - logging
 - driving cars
 - growing crops
 - constructing roads
 - building dams
 - Some changes are beneficial and some cause problems.

Evaluating Changes in Ecosystems, *continued*

- Human solutions can cause environmental problems.
 - Some changes that seem beneficial to humans may cause environmental problems.
 - For example, while dams may provide power, they may also alter the course of rivers and prevent yearly flooding that deposits nutrients in soil.
 - If a modern construction project is likely to alter or destroy an entire ecosystem, it may have to be redesigned, relocated, or cancelled altogether.

Evaluating Changes in Ecosystems, *continued*

- Nonnative species can cause changes in an ecosystem
 - Nonnative species may compete with native species for habitat or food.
 - Nonnative species may have no natural predators, and multiply too quickly.
- Nonnative species can be introduced in many ways.
 - Some species move from one ecosystem to another on their own.
 - Humans can also bring nonnative species to other ecosystems.